

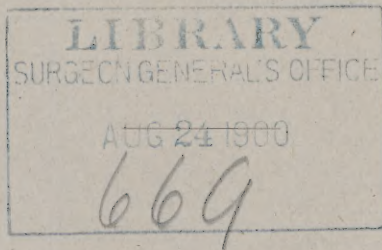
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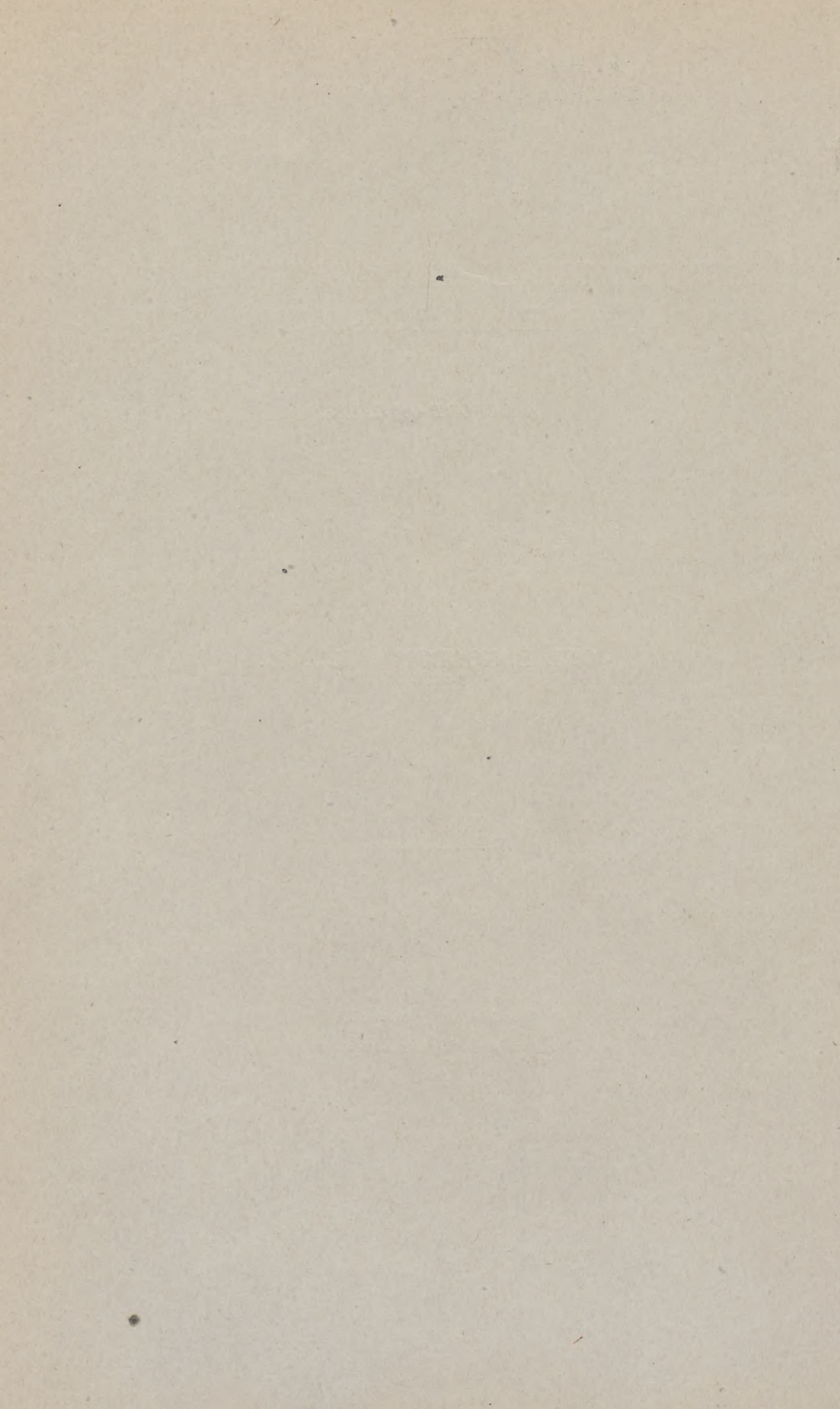
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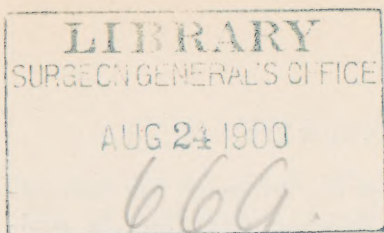
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POTT'S PARAPLEGIA AS AFFECTED BY THE CORRECTION OF THE SPINAL DEFORMITY.

A REPORT OF CASES.

BY JOEL E. GOLDTHWAIT, M.D.,
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UNTIL the past two or three years the commonly accepted treatment of Pott's paraplegia consisted of rest in bed, with as thorough fixation of the spine as possible, together with the less common but frequent use of traction and counter-traction.

The duration of the paralysis varied with the location of the disease and age of the patient. Rarely did it disappear before six months, and that in children, while in adults few recovered in less than eighteen months or two years. In a certain number of cases, even after a longer period of time and under the most careful treatment, the power failed to return. This has formerly been considered to be due to degeneration of the cord, and, consequently, it was supposed that the condition was hopeless.

Various theories have been offered in explanation of the paralysis, such as abscess; direct pressure of the softened vertebra upon the cord; pressure due to a tuberculosis of the meninges, the tubercular process extending into the cord itself, involving the interstitial tissue surrounding the nerve fibres; an œdema of the cord, due to imperfect circulation at the seat of the disease; and probably others which have escaped my notice or memory.

As the result of the work which has been done during the past three or four years, in connection with the correction of the spinal deformities, the course of the paralysis has been changed in so striking a degree that it becomes necessary for us to reconsider some of our former views, and it may be possible, by studying a group of such cases, to speculate more definitely upon the exact etiology of the symptoms.

The most striking fact in treating these cases is that, whatever the etiological factor may be, the correction of the spinal defor-

mity, or only a partial correction of the deformity, has been followed by a very rapid and at times an instant relief from the paralysis. This result has been so universal in my own experience, and so common in the hands of others who have pursued the same method, that while at first the disappearance of the paralysis was supposed to be only a coincidence, coming in connection with the correction of the deformity, at present the correction of the deformity has come to be of secondary importance to relief of the paralysis which is to be accomplished in this way.

In my own experience of the eleven cases which have been treated in this way all have shown a marked improvement in the motor control of the legs within a few days of the time of treatment. In some of the cases, either because of the location of the disease and the inability to hold the spine in the corrected position, or because of inability to control the after-treatment, it has not been possible to make the improvement permanent, and relapse has occurred. The fact, however, that the paralysis has been relieved by the change in the position of the spine has been demonstrated and the demonstration repeated several times in one of the cases.

Of the eleven cases, five were reported at the last meeting of this Association, in the paper entitled "Forcible Straightening of Spinal Deformities Resulting from Pott's Disease," and they are again mentioned because the subsequent history of the cases is of fully as much interest as the immediate result.

Of the eleven cases three were children; of these, one with disease in the upper lumbar region was entirely and almost immediately relieved by hyperextending the spine. Ether was not used, and after one year, during which the position of the hyperextension has been maintained, there has been no return of the paralysis. In another child, with disease of the first and second dorsal vertebrae, the weight of the head alone was not enough to correct the deformity, so that ether was used for this purpose. This was followed by marked improvement in the control of the legs, but the improvement lasted a few days only. The treatment was repeated once or twice with the same result. Each time the paralysis was relieved, but the improvement lasted only a few days, the relapse being due undoubtedly to the inability to maintain the corrected position because of the location of the disease. The child is none the worse

for the treatment, and is now being treated as formerly—in bed, with immobilization of the spine. The third child, with a large deformity in the mid-dorsal region and with complete paraplegia, was considerably benefited by the improved position of the spine, but the improvement has not been permanent.

Of the eight adult cases five were men. The oldest patient was a man, forty-three years of age. In only one of the cases was ether used, and this was before the apparatus which is now in use had been perfected. At the present time I feel sure that even in this case ether would not have been necessary.

Of this group of adult cases, one of the most suggestive and interesting, from a physiological as well as a pathological point of view, is the case of the man, forty-three years of age. In this case the disease of the spine had been present for about six years. During the first part of the time he was under my care at the Carney Hospital, but paralysis developing, and having no home, he was sent to the Almshouse Hospital at Long Island, and there he had lain for four years previous to the commencement of the present treatment. While at Long Island he was under the care of Dr. E. W. Taylor, and it was through his kindness that it was possible for me to see him. The knuckle was in the mid-dorsal region, and there was, with the exception of a slight tremor in three middle toes of the right foot, absolute paralysis of everything below the waist, together with a partial paralysis of the bowel. The knees and ankles were stiff, while the feet were not only stiff but were fully extended, so as to be in a straight line with the legs instead of at a right angle to them.

The patient was transferred to the Carney Hospital in July of last year and a plaster-of-Paris jacket applied, with the spine in the hyperextended position. In a few days he could move the toes of both feet, but because of the long disuse the cerebation was uncertain for some time; for instance, when asked to move the right foot the left one was perhaps the one moved, and *vice versa*. This gradually improved, however, so that later the cerebation was in no respect peculiar.

Since July jackets have been applied about every six weeks, so that the spine has been kept constantly hyperextended. Ether has been used but once, and that not for the spine, but to free the con-

tractions and adhesions about the knees and at the ankles. There has been a gradual improvement in the voluntary control of the muscles of the legs, so that at the present time there is a response in practically all. The improvement has naturally been slow, as after four years of absolute disuse the muscles had undergone the most extreme atrophy. The rectus femoris, for example, was at first represented under contraction by a small band not wider than one finger and not as thick, while at present, even though it is still very small, it has developed sufficiently so that when the knee is raised, flexing the joint thirty or forty degrees, the patient is able voluntarily to lift the leg from the bed and straighten the knee.

At the present time the patient is able to stand with the aid of crutches, and by being steadied can swing himself along the length of the ward.

The case is of interest, even though there be no further improvement, which is possible, as he has recently developed tuberculosis of the genito-urinary tract, as it demonstrates that the function of the spinal cord can be wholly arrested for at least four years, and still retain a portion at least of its power of transmitting impulses.

Of the other cases, one of especial interest is Case IV., a young woman, twenty-one years of age. Paralysis had been present for about eighteen months and the disease for four years. The patient was first treated in January, 1898, with almost instant relief from the paralysis, so that in one month she was walking about. She then became and has since remained an out-patient, reporting about once in six weeks to have the jacket reapplied. The point of special interest is that during the extreme heat of last summer her request to have a removable jacket was granted, the understanding being that the jacket was to be opened only when lying down. One week from that day the patient was brought to the hospital with paraplegia. She was sent to the ward and a jacket applied the following morning. As soon as she was put in position on the frame—no force being used other than her own weight—she remarked: "Now my legs are all right." The jacket was applied, and that afternoon she left the hospital, walking as well as ever. There has been no trouble since except once, when the jacket had softened considerably—the legs are said to feel weak and unsteady. The new jacket entirely relieved this sensation.

In two of the other cases there has been a temporary return of the paralysis, due to the softening of the jacket, and in both cases the condition has been relieved at once by the correction of the position of the spine in applying a new jacket.

The following case (Case XI.) is mentioned rather more in detail, as it represents a somewhat different condition, and the marked improvement which followed the treatment was more unexpected than in the other cases. With this one exception the cases which are here reported had developed the paralysis in connection with the acute or active stage of the disease. In this case, however, the active disease in the spine had occurred many years before, the spine having become ankylosed in the position of extreme deformity. In such a condition naturally very little was expected as the result of any attempt to correct the position of the back, the paralysis presumably being due to a late suppurative process developing in the rigid canal, and thus causing pressure. The actual result, however, in this case was equally as striking as that obtained in the others. The paraplegia was much lessened by the application of the first jacket, and after the last one, which represented the third jacket, she was able to be up and move about. In this case the sensory paralysis which was present was likewise relieved. The cases in detail are as follows :

CASE I. M. A., a boy, eight years of age, with disease of the upper lumbar spine of two years' duration. Paraplegia developed one year ago, and was entirely relieved by hyperextending the spine, without ether. Plaster-of-Paris jackets have been worn since then, the same position of the spine being continued. There has been no return of the paralysis as far as the motor control is concerned, but the knee reflexes are more lively than normal. There is no ankle clonus or noticeable weakness of the legs.

CASE II. J. F., a boy, six years of age, with high dorsal caries of one year's duration; during that time he had been under treatment with the usual braces. A few months ago paraplegia developed, which was complete at the time of my examination. Ether was used and the spine straightened, with marked relief, so that the child was able to move the legs about quite freely. In a few days, however, the paralysis returned, owing probably to the location of the disease and the inability to hold the spine hyper-

extended. The same manipulation was attempted two or three other times, and each time there was the same improvement, but also the same relapse in a few days. The child is none the worse for the treatment, and at present is being treated by recumbency with as thorough fixation as is possible.

CASE III. R. L., a girl, aged eight years, with Pott's disease of three years' standing, and quite a marked knuckle. She was treated at the Good Samaritan Hospital. Several attempts were made without ether to hyperextend the spine by both Dr. Thorndike and myself, and while two of the attempts at least were followed by improvement, it was of but short duration. At present the paralysis is the same as before the treatment was begun.

ADULTS.

CASE IV. K. St. J., a young woman, aged twenty-one years, with Pott's disease of four or five years' duration. There was a marked deformity, and paraplegia had been present for nearly two years previous to the time of the correction of the position of the spine. Ether was used, and after the correction a plaster-of-Paris jacket was applied. The paralysis was relieved at once, and there has been no return, except once when the jacket was partially removed at home, and once or twice when the jacket had softened. At each time the correction of the position and a new jacket have relieved the trouble. The knee-jerks have remained much exaggerated. There is no ankle clonus, and the voluntary motor control is normal.

CASE V. T. D., a man, aged twenty-one years, with disease in the mid-dorsal region of two years' duration. Paraplegia, in which the bowel also was involved, developed twelve months ago. The position of the spine was corrected without ether with instant relief of the paralysis. An abscess has developed since the treatment was commenced, but there has been no further trouble from paralysis, either of the legs or bowel, except once, when there was a slight temporary return, due to the softened jacket. A new jacket entirely relieved the difficulty. The knee reflexes are still exaggerated.

CASE VI. H. G., a man, twenty-six years of age, with disease

in the lower dorsal region of two and one-half years' duration. Paralysis has been present, with the bowel also involved, for six months prior to the treatment. The correction of the position relieved the paralysis at once, and there has been no trouble during the past year, except slight temporary trouble when the jackets have softened.

CASE VII. A man, thirty-six years of age, with mid-dorsal Pott's disease of comparatively short duration previous to the time of the first examination, in April, 1898. At that time there was also disease of one knee-joint. The treatment for the spine was imperfectly carried out, owing to the fact that the patient lived at a distance from the city; but with the one jacket, with an improvised apparatus, there was a marked control in the motor control of the legs. The treatment was discontinued and the paralysis returned.

CASE VIII. T. M., a man, aged twenty-nine years, with disease of the mid-dorsal spine of five years' duration. At the time of the first visit to the Carney Hospital, in January, 1899, there was well-marked paraplegia. This was entirely relieved by the application of a jacket in the hyperextended position, and there has been no trouble but once, when the jacket had softened.

CASE IX. T. D., a woman, aged thirty-two years, with disease in the upper lumbar region of two years' duration. Paralysis had been present for about three months previous to her admission to the Carney Hospital four weeks ago. A jacket was applied in the hyperextended position, and there has been a steady improvement, so that the patient is now able to walk about.

CASE X. P. M., a man, aged forty-three years, with disease in the mid-dorsal region of six years' duration. For four years previous to beginning the present treatment he had lain on his back in the Almshouse Hospital, at Long Island (Boston), with absolute paralysis of both legs from the waist down, together with paralysis of the bowel. It was through the kindness of Dr. E. W. Taylor that I was able to see the patient. Nine months ago he was transferred to the Carney Hospital. At that time there was absolutely no voluntary muscular movement below the waist, except a slight tremor in the three middle toes on the right foot, and this was so slight as to escape notice unless carefully looked for. Both feet

were fully extended at the ankle, and were rigid, partly due to joint adhesions and partly to muscular stiffness. The knees or hips also could not be bent. The legs were œdematous, and the circulation, as shown by the condition of the skin, was very poor. Without ether the spine was hyperextended and a jacket applied. Within a week there were distinct voluntary movements in both legs. A few weeks later, under ether, the tendon-Achilles were cut and the joints of the legs manipulated. Until four months ago the patient made a steady gain, so that there was a voluntary response in practically all of the muscles of the legs. At that time a tubercular process developed in one testicle, necessitating surgical interference and a temporary discontinuance of the treatment for the back. For the past three months the spinal treatment has been continued, together with the manipulation of the legs, and even though there are some signs of a tubercular process higher up in the genito-urinary tract, the improvement has gone on so that there is enough strength in the anterior thigh muscles to raise the foot from the bed and straighten the leg when the knee had first been flexed and supported. With the aid of crutches and an assistant to steady him he is able to walk the length of the ward. The improvement has been so steady that were it not for the manifestation of the disease in the other organs I feel very sure that he would be able ultimately to go about independently.

CASE XI. Miss E., a woman, forty years of age, with a large, rounded kyphosis invading the mid-dorsal region, which had developed over twenty years before. In 1892 there was an attack of paraplegia lasting for three months. In September of last year the paraplegia again developed, with sensory disturbances. The reflexes were extremely exaggerated and the voluntary motor control entirely lost. The patient was seen in consultation with Drs. S. A. Lord and C. F. Painter. A jacket was applied with the spine hyperextended as much as possible, and since then three or four other jackets have been used. With each the paralysis has lessened, so that at present the patient is able to walk about freely.

The apparatus which was used to obtain the desired position of the spine was described and pictured in a paper read by me before this Association at the meeting held last year, and afterward published in the *Boston Medical and Surgical Journal*, July 28, 1898.

